Osteoporosis in Primary Care

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Objectives

- Definition and Pathophysiology
- Risk Factors
- Diagnosis
- Screening
- Treatment Options
- Prevention
Definition & Pathophysiology

- Osteoporosis is low bone mass, microarchitectural disruption, and skeletal fragility resulting in decreased bone strength and increased risk of fracture.

- Result of prolonged imbalance of bone remodeling:
  - Normally, the activity of osteoclasts (bone resorption) are balanced by that of osteoblasts (bone formation).
  - Bone mass typically peaks in early 30s.
  - With ageing bone mass gradually decreases.
Hormones that contribute to decrease BMD with aging

- **Calcitonin** inhibits bone resorption and promote bone formation (*decreases*)
- **Estrogen** inhibits bone breakdown (*decreases*)
- **PTH** increase bone turnover and resorption (*increases*)
Risk Factors

- Advanced age
- Previous fracture
- Parental history of hip fracture
- Smoking, alcohol consumption
- Glucocorticoid therapy
- Low BMI (less than 58 kg [127 lb])
- White
  - Inflammatory disease: Ex: diabetes, RA, Crohns
  - Malabsorptive disease: ex. Celiac’s, Crohns
  - Medications: PPIs, SSRIs, anticoagulants
Diagnosis

- **DEXA**
  - Osteopenia / Low Bone Density: T score -1 - -2.5
  - Osteoporosis: T score < – 2.5

- **Fragility Fracture**
  - Minimal Trauma = ground level, walking speed
  - **Vertebral**
    - most common, 2/3 are asx
    - >2cm loss of height predictive of vertebral compression fx
  - **Hip**
    - Highest risk of mortality
  - Wrist
  - Humerus
Reading a DEXA report

- **T-score**: comparing to healthy young adult population (peak bone mass)
  - post-menopausal women, men >50

- **Z-score**: comparing to age and gender matched population
  - Premenopausal women, men <50, children

<table>
<thead>
<tr>
<th>Region</th>
<th>BMD</th>
<th>T score</th>
<th>Z score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lumbar Spine</td>
<td>0.860</td>
<td>-1.6</td>
<td>0.4</td>
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<tr>
<td>Femoral Neck</td>
<td>1.241</td>
<td>-2.5</td>
<td>-0.8</td>
</tr>
<tr>
<td>Total Hip</td>
<td>1.072</td>
<td>-1.0</td>
<td>0.3</td>
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FRAX - Fracture Risk Assessment Tool

Start therapy when:
- Major osteoporotic risk fx > 20%
- Hip Fracture >3%
Screening

- **USPSTF**
  - All women age 65+
  - Postmenopausal women with clinical risk factors for fracture

- **Repeat DXA measurement**
  - Low bone mass: repeat every 2 years if risk factors present
  - Low bone mass w/o risk factors: repeat every 3 - 5 years
  - Normal bone mass w/o risk factors: repeat every 5 years

- **Screening BMD in men is controversial**
  - NOF recommend screening all men >70 or men age 50-70 with fracture risk

- *Importance of risk assessment*
  - the majority of fractures occur in individuals with low bone mass, not osteoporosis, because there are so many more patients in this category.
Treatment

When to start treatment?

- All patients diagnosed with osteoporosis
  - DXA T score < - 2.5
  - Hx of fragility fracture

- Low Bone mass (T score between -1.0 and 2.5) and FRAX 10 year risk >20% or 10 year risk of hip Fx >3%
Treatment

- **First line therapies**
  - Clinically proven to reduce risk of BOTH vertebral and hip fracture
  - Bisphosphonates
  - Denosumab
    - Both anti-resorptive agent

- **Other Therapies**
  - PTH analogs
  - SERMs
Bisphosphonates

- 3 oral bisphosphonates
  - **Alendronate (Fosamax)**
    - 70 mg qweekly or 10mg qdaily
  - **Risedronate (Actonel)**
    - 150 mg qmonthly or 35mg once weekly or 5 mg once daily
  - **Ibandronate (Boniva)**
    - 150 mg qmonthly
  - Treat for **5 years**

- IV Zoledronic Acid (Reclast) qannually x 3 years
  - requires Endo/Osteo clinic referral
Bisphosphonates

■ **Before prescribing**
  ■ Check Vitamin D and Calcium, replete before starting

■ **Contraindications**
  ■ Esophageal disorders
  ■ CKD (GFR <30L/min)

■ **Instructions**
  ■ Take first in morning, only with water
  ■ avoid food for 30-60 minutes
  ■ Sit/Stand Upright >30mins

■ **Side effects**
  ■ GI intolerance
  ■ Atypical femur fracture
  ■ Osteonecrosis of jaw
    ■ rare btw 1 in 10,000 to 1 in 100

Duration dependent, stop bisphosphonates after 5 years
Other Agents

- **Denosumab (Prolia)**
  - First Line agent
  - Prolia 60 mg SQ q6 months
    - Typically also requires referral to Endo/Osteo clinic
    - Increased fracture risk after stopping

- **PTH Analogs**
  - Bone forming and anti-resorptive
  - Teriparatide (Forteo) 20 mcg SQ daily for 2 years
  - Abaloparatide (Tymlos) 80 mcg SQ daily for 18 months

- **SERMs**
  - Raloxifene - only for patients with increased risk of breast cancer
Bone Holiday

- Oral bisphosphonates treat for 5 years with oral, 3 years with IV reclast
- After 3-5 years, we start “bone holiday” to decrease risk of atypical femur fracture and osteonecrosis of jaw
- Every 2 years recheck DEXA or bone turnover labs
  - serum bone specific Alkaline phosphatase and urine N-telopeptide
- If significant decrease in BMD, or increase in bone turnover labs, can transition to Prolia or other agent
Vitamin D and Calcium

- **Calcium: 1200mg of calcium/day**
  - 3 servings
    - 1 cup of milk
    - 3/4 cup of yogurt
    - Calcium fortified milk (almond, soy milk)
    - dark greens: broccoli, bok choy, spinach

- **Vitamin D: 800iu - 1000iu/day**
  - Fatty fish
  - Egg
  - Mushrooms
  - Vitamin D fortified cereal, milk
Strontium

- a metal that concentrates in bones
- approved in Europe for osteoporosis but not in North America
- shown to increase BMD but **NOT shown to reduce risk of fractures**
Weight Bearing and Resistance Exercises

- **Weight Bearing Exercises**
  - Dancing
  - walking/jogging
  - jumping rope
  - hiking
  - climbing stairs

- **Muscle Strengthening Exercises**
  - Weight lifting
  - using elastic bands
  - lifting own body weight
Questions?
Resources

- https://www.nof.org/patients/treatment/exercisesafe-movement/osteoporosis-exercise-for-strong-bones/